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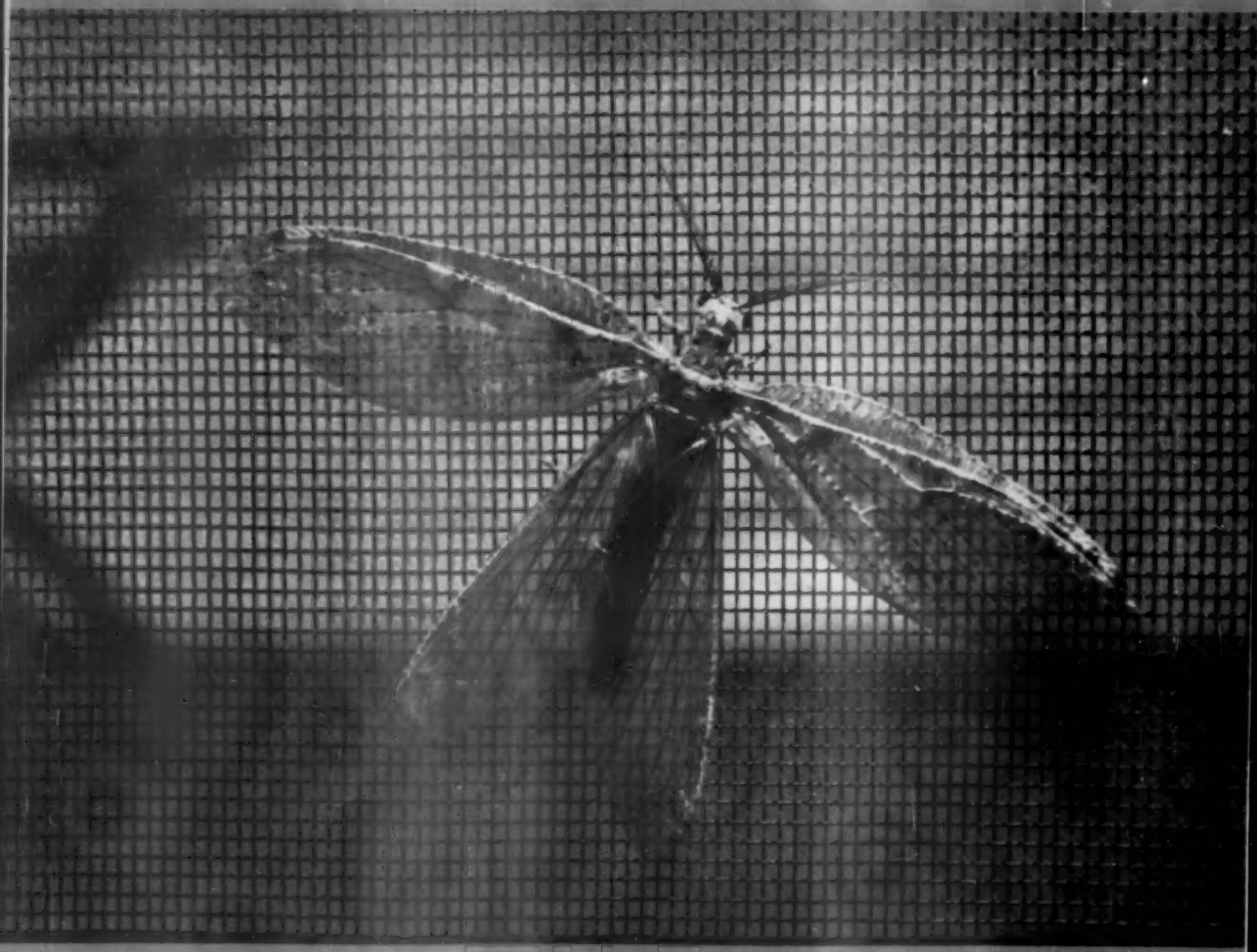
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Nocturnal Fishfly

See Page 312

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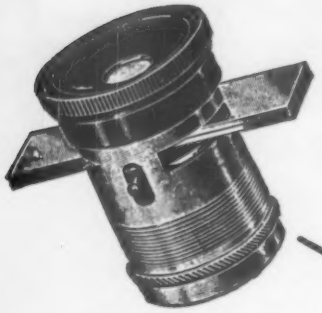

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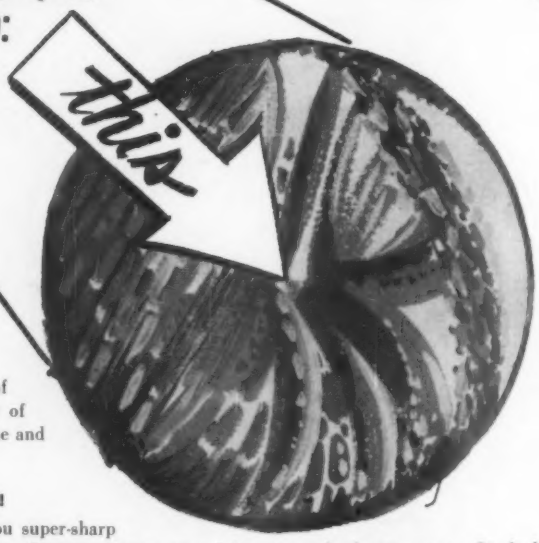

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PHYSICS

Element 101 Discovered

Mendelevium, the heaviest and rarest form of matter known, has been produced in the University of California's cyclotron. Identity based on only 17 atoms of new element.

➤ THE DISCOVERY of element 101, the heaviest and rarest form of matter on earth, has been achieved at the University of California by modern nuclear science.

The new element is a kind of "dinosaur" of the physical world. It existed at the birth of the earth, but like other elements heavier than uranium it sputtered and "died" out early, transforming itself by radioactive decay into lighter elements.

The brief regeneration of the long-extinct form of matter in the Berkeley 60-inch cyclotrons is an exciting chapter in physics.

Only 17 atoms of the new element were identified—an amount of matter that's invisible, unweighable, almost unimaginably small. Probably no form of matter has existed in such small quantity for nearly five billion years—since the birth of the earth.

The discoverers are members of a famous Berkeley science team who have been element-hunting successfully for over a decade. Their triumphs include the discovery of plutonium, fuel of nuclear energy. They are Drs. Albert Ghiorso, Bernard G. Harvey, G. R. Choppin and S. G. Thompson, research chemists, and Dr. Glenn T. Seaborg, leader of the team and a Nobel Laureate. The research was sponsored by the Atomic Energy Commission.

Dr. Ghiorso reported the discovery at the American Physical Society meeting in Washington.

Fissions Spontaneously

Dr. Ghiorso said element 101 has been given the name mendelevium (chemical symbol Mv), in honor of the great 19th century Russian chemist, whose periodic system of the elements is known to every student of high school chemistry. Mendeleev's system has been the key to the discovery of elements for nearly a century.

Mendelevium is intensely radioactive, decaying by spontaneous fission. Its half-life is between a half hour and three hours. It has chemical properties similar to those of thulium, element 69, a rare earth.

The new element has no direct practical value in atomic energy. But like the other transuranium elements, it will help broaden our understanding of matter and of the history of the earth.

Dr. Ghiorso said the big problem in making and identifying the new element was the infinitesimal quantity of matter involved. The experimenters had to "build" element 101 out of a starting material too small to see—about a billion atoms of element 99, another cyclotron-made synthetic form of matter.

To have any hope of detecting the presence of 101 atoms, the famous 60-inch Crocker cyclotron had to be "souped up." Methods were devised to deliver an extraordinarily intense beam of alpha particles to a very small area (1/32 by ¼ inch)—some 30 trillion alpha particles, the nuclei of helium atoms, passing through this space each second during bombardments. Drs. G. Bernard Rossi and Joseph G. Hamilton of the Crocker Laboratory performed these bombardments.

Water and helium were used to cool the target, because of the thermal heat generated by the bombardment.

Dr. Ghiorso and his colleagues electroplated their element 99 atoms (mass number 253) on the back of a thin gold foil. When alpha particles passed through the foil and smacked an element 99 atom with an energy of 41 million electron volts, the atom changed into element 101 and was bounced out of the foil. These 101 atoms were caught on an adjacent gold foil.

After bombardment, the gold-collecting foil was dissolved, impurities were removed, and the residue was separated into different chemical components. The fractions consisted of solutions containing element 99, element 100, and one that could only contain element 101 if it had been made.

Then tests of radioactivity were made of the different samples. The scientists expected to find an element 101 isotope with a mass of 255, decaying by alpha particle emission with a half-life of about five minutes.

At first they found nothing significant. Then in one of their experiments they recorded two spontaneous fissions in the 101 fraction. Repetition of the experiment consistently yielded the same result. They found the element has a half-life of from a half-hour to several hours.

Scarcity of the data and the surprising half-life made the scientists skeptical of the data at first. The shortest half-life for a spontaneously fissioning isotope previously reported was 60 days—some 500 or more times longer.

During their experiments, the scientists noted that the element 100 fraction also contained a spontaneously fissioning isotope. This led to an explanation. The scientists suspected they had made an isotope of element 101 different from the one they had sought—an isotope with a mass of 256.

If the strange 101 isotope actually decayed first by electron capture to element 100, and then element 100 decayed by spontaneous fission, the phenomena could be explained.

Off to the Materials Testing Reactor, at Arco, Idaho, the scientists went. They made a batch of atoms of elements 100 with a mass number of 256—which decayed by spontaneous fission with the right half life.

This made everything fit. The identification of element 101 had been confirmed by its chemical properties (separation), and by characteristic radioactivity of its daughter product (element 100, mass number 256).

The scientists say there is still an isotope to be found, of mass 255, decaying by alpha activity.

Science News Letter, May 14, 1955

PILOT FASHIONS—The new look for high altitude pilots is this Air Force T-1 pressure suit sported by test pilot Richard L. Johnson. Rubber tubes along the arms and legs inflate, tightening laces that apply pressure evenly over pilot's body.

AGRICULTURE

Cotton Pests Believed To Hitch Rides on Air

➤ THE PINK bollworm moth, one of the nation's major cotton pests, is believed to hitch rides on air currents to travel across the Cotton Belt. This mode of travel is now thought to be the cause of the pest's continued spread despite a tight quarantine.

Although known to be weak flyers, U. S. Department of Agriculture entomologist P. A. Glick has tapped a dozen pink bollworm moths at altitudes of from 100 to 1,000 feet in 37 flights over southern Texas. One of the high-gliding moths was caught over a desolate area of cactus, mesquite and grass, 15 miles from the nearest cotton field.

Since 1951, the Department reports in *Agricultural Research* (May) the pink bollworm moth has invaded 90 previously free counties in the Southwest.

Science News Letter, May 14, 1955

GEOPHYSICS

Show Model Aurora

Behavior of charged particles in earth's atmosphere is demonstrated inside a vacuum tube. Soft purple halo forms in magnetic field of a model earth.

➤ HOW AND where the dancing colored lights of auroras form was shown in Washington by a tiny model of the earth bombarded inside a vacuum tube by electrons.

In actuality, the electrons are protons thrown out by the sun, reaching the earth about two hours later. As the particles fall under the influence of the earth's magnetic field, made by a half-inch permanent magnet inside the model earth, they form a halo around it.

This is known as the "ring current" and it is believed to carry about 180,000 amperes, compared to the one-third of an ampere in a 60-watt electric light bulb.

The halo was a soft purple glow surrounding the one-inch earth in the demonstration at the American Geophysical Union meeting by Dr. Willard H. Bennett of the Naval Research Laboratory in Washington. Mercury vapor inside the vacuum tube gives the glow as its atoms are excited by impinging electrons.

The real ring current is invisible, but instruments could detect it if and when man ever sends a satellite up to 4,000 miles above the surface.

Meanwhile, Dr. Bennett reported, he is building a bigger, more accurate model of his device "showing how charged particles behave in the earth's magnetic field." Electrons, fired with an energy of 40 volts, represent protons of about one-half a billion electron volts, much higher energies than the one to five million electron volts suggested for the solar proton stream.

Nevertheless, Dr. Bennett said, his present model gives a qualitative picture. It shows the complicated system of orbits around the earth into which the incoming particles are thrown by the earth's magnetic field. It demonstrates that solar protons can fall to earth only in certain places, known as the auroral zones, one circling the North Pole and the other surrounding the South Pole.

The paths into which the particles are formed occupy the volume generated by rotating a crescent about the earth's magnetic poles, with the crescent's horns touching at the auroral zones, thus producing the ring current, which is brighter in spring and fall in the device as auroras are known to be.

When the model earth, on which longitude and latitude lines are painted a fluorescent green, is adjusted to represent summer and winter, the pattern changes slightly. It then shows local intense auroras, which are often followed by magnetic storms interfering with long-distance communications by shortwave radio. The ring current is still present, but it is less intense.

Dr. Bennett's model demonstrates that auroras are generated at the same time in both the Northern and Southern Hemispheres, which has not been established by observations. Scientists hope to confirm the simultaneous appearance of auroras in both hemispheres during the International Geophysical Year, scheduled for 1957-58.

His device is called the Stormertron, after the famous geophysicist Prof. Carl Stormer of the University of Oslo in Norway. The existence of a ring current surrounding the earth was first suggested by Drs. Sydney Chapman, V. C. A. Ferraro and D. F. Martyn on theoretical bases.

Science News Letter, May 14, 1955

PSYCHOLOGY

Favors Stricter Rearing

➤ A CHANGE in America's child-rearing habits that might produce more neurotics but would cut down on juvenile delinquency and crime was advocated by a prominent police psychiatrist.

Dr. Douglas M. Kelley, professor of criminology at the University of California, who was the psychiatrist at the Nazi Nuremberg trials, gave his opinions at the meeting of the Texas Medical Association in Fort Worth.

Dr. Kelley said old-fashioned child-raising was strict and it taught self-control. Then along came Freud and his disciples who pointed out—correctly, Dr. Kelley admits—that this kind of training produced neurotics. Discipline tended to scar the child's psyche.

With the increasing tendency to let children have their head with a minimum of parental discipline, immature childhood behavior has been more often perpetuated in later years. In the adult, infantile behavior is psychopathic and destructive. Hence there is more delinquency and crime.

The psychiatrist called for a search for a middle ground between the modern and old-fashioned views. He admits he does not have an easy formula. But he would favor coming closer to old-fashioned methods that teach self-control.

"We might produce more neurotics," he said, "but we would produce fewer psychopaths and less crime."

Dr. Kelley expressed doubt that a normal civilization can be produced.

"If we do not choose to run some risk (of increased neuroticism)," he stated, "we must yield to the definite development of more frequent character disorders who will increase our delinquency and criminal rates.

"In the far future this may bring about a situation where a select group of unusually aggressive psychopaths ponder a final printed volume entitled, 'The Rise and Fall of Civilization.'"

Science News Letter, May 14, 1955

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GENERAL SCIENCE

Strong UN Key to Survival

A world police force under the United Nations, composed of men of all nations, urged as an alternative to the mass killings from a possible nuclear war.

➤ SURVIVAL IN the atomic-hydrogen age requires strengthening the United Nations with a "police force composed of men of all nations" to enforce its decisions, Rep. Chet Holifield (D-Calif.), a member of the Joint Committee on Atomic Energy, has urged.

Alternatives must be found for the "mass killings" and "mutual destruction" that would result from a nuclear war, he told a meeting of the Federation of American Scientists in Washington. Atomic energy must become a "symbol of peaceful endeavor and hope" for a better life for oppressed millions, Congressman Holifield urged, not one of "death and destruction."

One of four speakers discussing "Nuclear Radiation Hazards and Their Political Implications," he said that no matter how "difficult the task and discouraging the setbacks," the U. S. must strive through the UN to achieve world peace.

Dr. John S. Toll, University of Maryland physicist, described the physical effects of radiation. The biological effects were reported by Prof. H. Bentley Glass, geneticist at Johns Hopkins University, Baltimore, Md. Sen. Clinton Anderson (D-N. M.), also a member of the Joint Congressional Committee on Atomic Energy, was the fourth speaker.

U. S. defenses, Dr. Toll said, are often "for last year's weapons rather than tomorrow's" because Atomic Energy Commission statements concern weapons already tested, avoiding prophecy.

Fall-out danger, great as it is from hyrogen bombs that can vaporize an entire city and paralyze a state, might be increased by designing weapons, such as the cobalt bomb, to increase radiation hazards, Dr. Toll said. This weapon would not have to be delivered but could be exploded within the "home" country to spread deadly radioactivity around the world.

"Desperate losers in a future atomic war, or a group with a Nazi-like belief in their role as a super race, might explode such a radiological weapon after they had prepared and stocked appropriate under-ground shelters for themselves," Dr. Toll said. He pointed out that it is easier and cheaper to make a cobalt bomb now than when such a bomb was first suggested in 1950.

The modern equivalent of the "scarlet letter" is the "label of security risk," a brand that can never be removed, Dr. M. Stanley Livingston, physics professor at Massachusetts Institute of Technology and chairman of the Federation's meeting, pointed out in his introduction of the speakers.

The recent news blackout by the Defense Department was an added difficulty in finding any physicist to discuss political implications of radiation hazards, Dr. Livingston said.

After being turned down by scientists working directly for or under contracts to the AEC, Dr. Livingston noted, two physicists employed by the Defense Department agreed to appear, then later withdrew when Secretary of Defense Charles Wilson imposed restrictions on public statements by its employees.

The dilemma created by present security restrictions, Dr. Livingston said, is that "those who know will not speak and those who do not know, cannot speak with authority."

"Finally, in desperation and open rebellion against these pressures," Dr. Livingston said, "Dr. Toll and I agreed to stick our necks out and appear on the program." Both are members of the Federation of American Scientists, a nation-wide organization of scientists interested in the interrelation of science and government.

Science News Letter, May 14, 1955

MEDICINE

Dentist Should Watch Cleft Palate Infants

➤ CHILDREN MUST start going to the dentist at the age of six months, if they have the misfortune to be born with a cleft palate, Dr. George Warren Pierce of San Francisco declared at the meeting of the American Association of Plastic Surgeons in Washington.

Those with this common birth deformity usually have teeth that do not meet for a proper bite and have a distorted dental arch. If treatment of these deformities is started at the age of three or four, a better result can be obtained, Dr. Pierce said.

But the dentist should see the child while he is still an infant and then every six months until treatment is started.

If the baby teeth decay, they must be filled promptly. Loss of decaying baby teeth is disastrous for these youngsters. The baby teeth must be in the mouth for successful treatment of the malformed dental arch.

Babies with such unsightly facial blemishes as hairy moles, blood tumors and harelips can be operated on safely when they are a week old, provided local anesthesia is used, Dr. Richard E. Straith of the Straith Memorial Hospital, Detroit, declared.

Operations to correct such defects can be done at this early age, before the new baby is taken home from the hospital, if it weighs at least six pounds, is eating well and is otherwise normal.

Science News Letter, May 14, 1955

• RADIO

Saturday, May 21, 1955, 5:00-5:15 p.m. EDT

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

A. Wiener, head of Israel's Irrigation Projects, will discuss "Irrigation for More Food."

CHEMISTRY

Life Chemicals Built From Vinegar Acid

➤ SOME OF the most complex life chemicals, nucleic acids and steroid compounds, have been built up in the laboratory from simple acetic acid, which puts the bite in vinegar, by two research scientists, Drs. Samuel Gurin and D. Wright Wilson of the University of Pennsylvania.

This is a further step toward understanding how life processes work. Dr. Wilson has synthesized nucleic acids, fundamental sources of protein, from simple acetic compounds by way of the nitrogen-containing compound uracil. Dr. Gurin has produced cholesterol, the steroid compound occurring in fat, through the intermediate compound squalene. Radioactive tracers allow the scientists to follow the steps by which protein and cholesterol are built up in their experiments.

Chemicals extracted from liver tissue by the Pennsylvania scientists, as a clear solution containing no living cells, are able to build simple acetic acid compounds, whose atoms are strung together in straight chains, into complicated life chemicals characterized by structures which are networks of molecular rings.

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AMERICAN EGRET — Feeding on fish it snatches from shallow water, this slim, graceful bird breeds in southern United States, Central and South America. The male's long plumes were once fashionable decorations for ladies' hats.

MEDICINE

Why Vaccine Trouble?

Surge of polio attacks after inoculation by withdrawn vaccine may have been caused by unkilled virus in solution, or injection may have triggered already present infection.

➤ THE POLIO vaccine withdrawn from use, after paralytic cases were discovered in children inoculated with it, may have produced the disease by one of two theoretical effects:

1. All the live virus used in making the Salk dead virus vaccine may not have been killed.

2. Associated paralysis may have occurred not as the result of the vaccine itself as such, but because of the injection.

The second possibility is a difficulty that has been recognized and upon which research has been conducted for some time. The irritation caused by the injection is believed to localize polio virus, not necessarily in vaccine, and thus cause clinically identified polio paralysis in the part of the body where the injection was given.

The cases of polio reported following the use of Salk vaccine made by Cutter Laboratories, Berkeley, Calif., developed paralysis near where the injections were given. In the mass tests of the Salk vaccine made last year and evaluated in the report issued last month, paralysis in vaccinated children was negligible, statistically speaking.

In the rigorous tests of the vaccine made by the Cutter Laboratories during the three-month period of manufacture, it was judged pure, potent and safe. At various stages of manufacture it was inoculated into monkeys, guinea pigs, rabbits, mice and cultures, tested for contamination. The brain and viscera of experimental animals were inspected for any sign of disease.

The vaccine now withdrawn passed these strict tests and was not suspected of any difficulty of any sort. It was therefore licensed by the U. S. Public Health Service. When, however, there were reports of the cases of paralytic polio in the vaccinated children the government quickly withdrew all the vaccine from use.

It will take several months of investigation, at least, to determine what is the trouble. The incubation period of polio is seven to 14 days. The vaccine is a relatively perishable article and has an expiration date of six months.

The progress of medicine records some difficulties with immunizing agents in past years. The last case of a licensed material of a similar sort that gave serious trouble was diphtheria anti-toxin in Dallas in 1924. In the use of the BCG vaccine against tuberculosis used in France there was once a considerable number of deaths. Four to five years ago in Japan there were some 75 deaths reported from defective diphtheria toxoid.

Trouble with a polio vaccine of a different sort, not a killed virus, occurred in 1934-35 when a preparation being used experimentally, and not yet licensed by the government, did cause cases of polio and deaths among children given this vaccine. These disastrous results put a stop to polio vaccine-making for a time. But knowledge was gained in subsequent years, the Salk vaccine was finally produced and came through its massive tests successfully.

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ASTRONOMY

Horoscopes Fill Gaps In Astronomy, History

➤ HOROSCOPES INTENDED to forecast the fortunes of individuals among the ancient Greeks are being used to fill important gaps in our knowledge of astronomy as well as historic events, the American Philosophical Society meeting in Philadelphia was told by Prof. O. E. Neugebauer, mathematical historian of Brown University, Providence, R. I.

The earliest Greek horoscopes known to science are preserved on papyri and are dated slightly before the beginning of the Christian era. The great astronomer Ptolemy wrote his "Almagest" about the same time, 140 A.D., but Ptolemy was concerned only with theoretical astronomy. Very little information is available for that time about actual positions of sun, moon and planets.

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PHYSIOLOGY

More Cats Are Southpaws

➤ THE FAMILY cat may have a preferred paw just as her owner may be right-handed or left-handed, and pussy is most often a southpaw when she is not ambidextrous.

This was shown in experiments conducted by Dr. J. Cole of the University Laboratory of Physiology, Oxford University, in England.

The finding is important because it adds to our knowledge of the handedness of various species from parrots to men, and because it throws light on the cause of handedness.

Of individuals with one side or the other dominant, left-handers seem to predominate among cats and parrots, right-handedness is most common among humans, and rats, monkeys, and chimpanzees are in between. This is the conclusion from Dr. Cole's research and that of others.

Dr. Cole's research with cats is particularly interesting because of its bearing on theories of what makes one side dominant.

One theory is that handedness is the result of feeding habits. If a mother habitually puts a cookie or a cereal spoon in baby's right hand, the baby thus rewarded for putting the right hand to his mouth might be expected to develop right-handedness.

But cats, Dr. Cole points out, do not feed by putting food into the mouth with the paw. In fact, some difficulty was encountered in persuading pussy to reach for a bite of food with one paw.

Kitty was induced to use a paw by putting a tempting bit of rabbit meat in a glass tube. (Rabbit was used, Dr. Cole explains, because this kind of meat was not rationed in England.) At first the morsel was placed in the very end of the tube where the cat could reach it with her mouth. Later it was pushed down the tube so that she would have to reach in with one paw. If she used the left paw 75 times out of 100 reaches, it was concluded that she was a southpaw. Of the animals tested, 20% were right-handed, 38.3% left-handed and 41.7% ambidextrous.

Dr. Cole suggests that the anatomy of the brain is more important than experience in making an animal prefer one hand or paw.

The cat experiments are reported in the April issue of the *Journal of Comparative and Physiological Psychology*.

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MEDICINE

Improve Radioactive Spotting of Tumors

➤ MORE ACCURATE spotting of brain tumors by radioactive arsenic is now possible with an improvement in the detecting method devised by Dr. Gordon L. Brownell, physicist, and Dr. William H. Sweet, brain surgeon, of Massachusetts General Hospital in Boston.

Radioactive arsenic is injected into the patient's veins. The amount of the deadly chemical is so small it cannot poison the patient, who then lies for one hour while twin scintillation counters move back and forth, scanning the head line by line.

Arsenic concentrates in brain tumors and the machine outlines a map of these areas. The new equipment is more sensitive than that previously used, and Dr. Brownell believes that it will increase accuracy of the procedure. In the first 400 cases, the old equipment found and correctly localized about 80% of the tumors.

The two doctors' research was supported by the American Cancer Society.

Science News Letter, May 14, 1955

METEOROLOGY

"Brain" Forecasts Daily

Electronic computer grinds out nation-wide wind patterns for weather forecasts. Its use in day-to-day forecasting is the greatest meteorological advance in decades.

➤ A GIANT electronic "brain" is now predicting weather flow patterns 36 hours in the future at least as accurately as human forecasters.

Total forecasting time is about the same for machine and humans, but it is expected to shorten as the meteorologists get more experience and faster computers.

Operation of the computer for weather prediction, by the Joint Numerical Weather Prediction Unit in Washington is the biggest forward step in forecasting in recent decades, meteorologists agree. This is the first day-to-day use of an electronic computer in weather forecasting in the United States. The technique is called numerical weather prediction. Meteorologists expect it will eventually result in more accurate predictions both for daily local forecasts and five-day, 30-day and longer predictions.

At present, what the machine comes up with is pattern of flow, or winds, at three levels—near the ground, 20,000 and 30,000 feet—and the vertical velocity between these levels. Precipitation factors are added by the weathermen, although the electronic computer is expected to take these into account in the future.

The Joint Numerical Weather Prediction Unit is a cooperative effort of the Navy, the Air Force and Weather Bureau. Its results will be given at first only to NWAC, the national weather analysis center that makes up nation-wide charts of air flow.

The machine's forecasts have been so successful that some of the regular forecasters for NWAC consult its results before making their own predictions.

The computer is fed information on air pressures in the atmosphere from about 50 stations. It then performs mathematical computations on these figures, using equations representing a much simplified mathematical model of the atmosphere.

Within an hour, after many millions of computations, the machine yields numbers from which nation-wide flow patterns at the three levels can be charted.

Using electronic computers is a revolutionary method in numerical weather prediction developed at the Institute for Advanced Sutdy, Princeton, N. J., by Dr. John von Neumann, now an Atomic Energy Commissioner, and Dr. Jule Charney, based on pioneering work by Dr. C. G. Bossby and J. Bjerknes.

In making forecasts at the present time, weathermen rely heavily on the skill and knowledge they have acquired, during years of practice, to make their predictions as accurate as possible.

With a picture of today's weather, they have to jump immediately from that to their own estimation of what to expect in 24 hours, or five or 30 days. Thus, essentially, weather prediction is an art, based on certain physical principles, but varying with the forecaster's personal judgment resulting from his experience.

With the electronic computer, most, if not all, of the forecaster's subjective judgments concerning winds is eliminated, although he still has to make subjective decisions to go from wind charts to actual weather forecasts.

Some meteorologists now foresee that high speed computers will eventually eliminate most of the forecaster's personal opinions from his predictions.

The techniques needed to record automatically the required weather data, to transmit them to a giant computer, and to retransmit a finished weather map to local forecasters are now available, or are expected to result soon from such programs as the one being inaugurated by the Joint Numerical Weather Prediction Unit.

Science News Letter, May 14, 1955

PHYSICS

Study Neutron Appetite Of Atomic Pile Materials

➤ MATERIALS FOR atomic piles are having their appetites for neutrons determined to make sure they will not stop chain reactions.

A potent tool for such measurements is the neutron, which can penetrate the nucleus because it has no electric charge.

The energy levels of the nucleus are of "vital importance" to reactor design, Dr. D. J. Hughes of Brookhaven National Laboratory, Upton, N. Y., told the American Physical Society in Washington.

When energies of bombarding neutrons are exactly the same as one of the many nuclear energy levels, they are usually absorbed.

Such neutron "resonances" for about 400 materials have been measured at Brookhaven, Dr. Hughes reported. They give "very direct information on the way in which neutrons" react with other nuclei. Since neutrons are the particles that keep chain reactions going, materials used for building or fueling reactors should have low neutron absorption.

"If an appreciable number were absorbed," Dr. Hughes said, the chain reaction could not be maintained. A book containing curves of nuclear resonances will be distributed at the International Conference on Atoms for Peace in Geneva next August, he reported.

ANTI-ECHO CHAMBER — Spun glass wedges in this soundproofed room eliminate reflected noises. In the chamber, designed by General Electric Company, an engineer, using a microphone and an oscilloscope, measures motor noises. Sound output as small as one-hundredth of a microwatt can be measured.

The instrument used to make such measurements is the "fast chopper." It consists of a mechanical shutter that opens and closes in less than one-millionth of a second, forming sharp bursts of neutrons in a beam from the chain reacting pile.

Neutron detectors about 75 feet away are used to measure the length of time required for the particles to travel this distance, which gives the energy of the neutrons. Resonances for different materials at various energy levels are measured in this way.

Results support the recent theoretical view, Dr. Hughes said, that nuclear matter, in spite of its extremely high density, is "surprisingly transparent." Nuclear size is still uncertain, he pointed out.

Science News Letter, May 14, 1955

MEDICINE

Search for MS Twins Yields 33—350 Wanted

➤ THE SEARCH for twins with MS, or multiple sclerosis, has yielded 33 identical sets so far, but the National Multiple Sclerosis Society would like to locate about 350 more, fraternal as well as identical.

This number of twin sets they estimate should be living in the United States with one or both members of the pair afflicted with the dread crippler, the cause and cure for which are not known. The twins are needed to aid investigation of possible causes of the disease.

Science News Letter, May 14, 1955

MAMMALOGY

White House Squirrel Fund Gives Grant-in-Aid

➤ A RESEARCH monument to the unknown squirrels, missing in action at the battle of the White House grounds, is now available to a highly-educated squirrel student.

The monument, $202.48, was given to the Wildlife Management Institute in Washington by Sen. Richard L. Neuberger (D-Ore.), who raised it from private contributions in behalf of the much-publicized White House squirrels.

The money, SCIENCE SERVICE learned from the Institute, is now on deposit and is known as the "Squirrel Fund." It is available for a grant-in-aid to be awarded to a working graduate student in an accredited college or university for a serious study of squirrels.

Sen. Neuberger originally intended the money for construction of a wire fence to protect both the squirrels and the President's putting greens.

The project requirements are unrestricted as to the type of squirrel to be studied, gray, black, or red, but they are discriminatory in that only wild squirrel projects will be considered.

"Country squirrels, that is, who would not know the difference between a putting green and a television camera," the Institute adds.

Science News Letter, May 14, 1955

PSYCHOLOGY

Some Unemployed Men Cannot Become Workers

➤ SOME UNEMPLOYED men, who lack the drive to work, may be beyond treatment and, therefore, must depend on a kindly employer or welfare agencies, a British doctor reported.

These men are not emotionally unstable as are psychopaths, Dr. W. L. Tonge of the Medical Research Council for Research in Occupational Adaptation pointed out, but have an absence of drive and are irresolute.

Basing his conclusions on the results of a 12-month psychiatric study, asked for by men who were classed as "psychiatrically disabled" and who had experienced long-term unemployment, Dr. Tonge said that the possibility remains that "these unhappy people can be neither treated nor coerced into becoming more productive citizens." When such conditions are found in wealthy men, he said, they are regarded as amusing eccentrics; in poorer men, however, "our society takes a sterner view."

During interviews, the patients showed that they were ineffective in all aspects of life.

They only rarely offered their thoughts on what they wanted in life or what they would like to do. Even when the interviewer touched upon subjects which might normally awaken self-interest, they were vague.

"Their complaints and dissatisfactions, their present difficulties or previous happiness, their hopes and fears for the future, whatever was in question, would arouse no definite effect or point of view which could be seized upon and discussed. A striking feature was their tolerance of the worst conditions and their seeming inability not only to obtain satisfactions, but even to desire them," Dr. Tonge reported in the *British Medical Journal* (April 30).

Science News Letter, May 14, 1955

INVENTION

Camera Can Be Turned Into Radiation Detector

➤ EVERY CAMERA in the United States is a potential radiation detector. This has been made possible by an invention which converts conventional cameras into detectors. The device does not interfere with the use of the camera for normal photographic purposes.

Invented by William A. Shurcliff of Cambridge, Mass., the detector unit employs a photosensitive sheet which will record a light spot on a black background when subjected to X-ray or gamma radiations. In describing his invention Mr. Shurcliff used a polaroid-type camera, stating that the immediate developing ability of this camera is a valuable means for determining the intensity of the radiation.

In operation, short-wave electromagnetic radiations pass through an intensifier, which emits a fluorescent light that causes the light spot. The radiation-caused light spot is readily distinguished from normal film fogging or from that caused by light leaks, Mr. Shurcliff points out.

The device was awarded patent No. 2,705,757. Its patent rights were assigned to the Polaroid Corporation of Cambridge, Mass.

Science News Letter, May 14, 1955

MEDICINE

Compatible Color TV Designed for Doctors

➤ THE FIRST color television system compatible with black and white sets and designed specifically for medical use was put on exhibit at the National Academy of Sciences meeting in Washington.

Commercial broadcast facilities could be used to televise operations in color as readily as closed circuits under the new system. It is built around a new, compact color TV camera having three Vidicon pickup tubes similar to the type used for black and white television.

Pictures could be seen on standard home-type color TV receivers with no alteration, scientists of the Radio Corporation of America said. The system was developed by a team of RCA scientists including L. E. Flory, J. M. Morgan and J. E. Dilley working under the direction of Dr. Vladimir K. Zworykin.

Science News Letter, May 14, 1955

IN SCIEN

PUBLIC SAFETY

Surgeons Advocate Auto Safety Belts

➤ THE DOCTORS who patch up vicitims of auto accidents today urged car manufacturers to put safety belts in future automobiles.

Or, if that is not practical, some other device that will resist impacts of at least 20 times the force of gravity should be installed, according to a statement issued by the American College of Surgeons, Chicago, in its *Bulletin* (May-June).

Since a large percentage of injuries and deaths occur at speeds of 40 miles an hour or less, the national organization of 20,000 surgeons also suggested:

1. Doors that will not open at relatively slow speed impacts.
2. Seats and cushions that will not rip away in an accident.
3. Energy-absorbing interiors for automobiles.

The group pointed out that the percentage of auto occupant deaths rose about 25% from 1933 to 1953.

The statement, prepared by the committee on trauma, under the chairmanship of Dr. R. Arnold Griswold of Louisville, Ky., was approved by the Board of Regents of the College of Surgeons.

Science News Letter, May 14, 1955

PUBLIC HEALTH

Marriages May Need Radiation Clearance

➤ IF A nuclear war is ever fought, children and teen-agers among the survivors will do well to get and keep an accurate record of how far they were from ground zero at the time, and of how much radiation fallout struck them. Such a record might protect them from giving birth to radiation-damaged offspring later.

Genetic mutations from radiation may be recessive traits, Dr. John Bugher, director of the Atomic Energy Commission's division of biology and medicine, said in Las Vegas, Nev.

In that case, the damage would not show unless two persons carrying the recessive trait married. Then their children would show the effects of the radiation damage to their parents' genes.

It might even be that to get a marriage license in the future, a couple might have to produce records showing that at least one of them could not have previously been exposed to a potentially gene-damaging amount of radiation, just as their parents may have had to show a negative blood test for syphilis.

Science News Letter, May 14, 1955

CE FIELDS

MEDICINE

See Particles That May Be Cancer Viruses

➤ PARTICLES THAT may be cancer viruses have been seen in ultra-thin slices of mouse breast cancers viewed through an electron microscope by three scientists at Johns Hopkins Hospital in Baltimore.

The particles could not be seen in normal mouse breast tissue nor in pre-cancerous breast tissue, according to the American Cancer Society, which supports the research by Dr. George O. and Mrs. Margaret K. Gey and Dr. Frederick B. Bang.

Whether similar particles exist in other forms of cancer is not known. In their studies, cells were sliced to a thickness of 400 angstrom units.

Such a slice is so thin it is invisible to the naked eye, but can be seen in an electron microscope that can magnify objects up to 100,000 times their size.

The particles look like viruses. They are round and have a dense area in the center or at one side. As many as 100 of them were counted in one microscopic area of a cell. They existed in bead-like rings around cell structures, in clusters and singly. The particles resemble but are smaller than the viruses of influenza and vaccinia.

Now under particular study by the scientists are a variety of breast tumors cultured by Dr. H. B. Andervont of the National Cancer Institute, Bethesda, Md. Some of these have similar particles and are now under test for the presence of virus. No human cancer at this time is known to be caused by a virus.

Science News Letter, May 14, 1955

AGRICULTURE

New Desert Farms Bring Insect Swarms

➤ THE MORE desert lands are cultivated, the more grasshoppers and locusts are cultivated.

This unfortunate give and take irony of arid land agriculture was brought to the attention of the International Arid Lands Meetings in Albuquerque, N. M., by Dr. B. P. Uvarov of London's Anti-Locust Research Centre.

Pointing out that human interference with the natural vegetation has set up ideal conditions for inviting insects to multiply, feed and swarm, Dr. Uvarov said that "the development of the truly arid lands is only beginning, but we have seen that it is almost certain to benefit such inhabitants of the desert as locusts."

The British scientist emphasized that past experience with "the oldest and most serious enemies of agriculture," should serve as a warning for future desert cultivation schemes.

"The problem tends to become more and more acute, and ever increasing efforts and expenditures are required to reduce losses from grasshoppers by chemical methods, which alone will never provide a satisfactory solution."

Likening the cause of grasshopper plagues in semi-arid lands to the deterioration of soil and its erosion, Dr. Uvarov put much of the blame squarely on humans and their "too rapid and thoughtless development" of the land. "Irrigated crops in the southern United States, Argentina and Central Asia suffer from grasshoppers whose existence in these arid lands was made much easier by man," he said.

Science News Letter, May 14, 1955

SURGERY

Esophagus Replaced by Intestinal Transplant

➤ INTESTINAL SECTIONS have successfully replaced diseased esophaguses in ten patients, Dr. K. Alvin Merendino, professor of surgery at the University of Washington, Seattle, has found.

In the operation, a part of the intestine is transplanted at the junction of the lower esophagus and the stomach as a substitute for the sphincter, he told the American Surgical Association meeting in Philadelphia. The sphincter is a valve-like organ that prevents gastric juices from backing up into the esophagus.

The disease resulting from its failure to function is known as peptic esophagitis. The new surgical technique was used only on patients upon whom all conventional methods of surgery had been tried without lasting results, Dr. Merendino said. The ten patients ranged from a boy of 17 to a 71-year-old woman.

The studies were supported by Initiative 171 funds and by the U. S. Public Health Service. Dr. Merendino was assisted in the research by Dr. David H. Dillard, a research fellow at King County Hospital.

Science News Letter, May 14, 1955

ENTOMOLOGY

Fishfly, One of Earliest Metamorphic Insects

See Front Cover

➤ THE FISHFLY, which begins its slow, nocturnal flights about this time of the year, is among the earliest insects with complete metamorphosis, fossil records show.

Found near rivers, streams, ponds and lakes, it has a wingspan of from 2¾ to 3½ inches.

The cover of this week's SCIENCE NEWS LETTER shows the moth-like insect. It lays as many as 2,000 eggs, the larvae of which take over two years to develop.

Science News Letter, May 14, 1955

MEDICINE

Many Viruses Destroy Test Tube Cancer Cells

➤ A WIDE range of viruses that completely destroy cancer cells growing in test tubes has been discovered by two University of Minnesota scientists, Drs. William F. Scherer and Jerome T. Syverton.

They found that the viruses of herpes simplex, pseudorabies, vaccinia, polio and five kinds of encephalitis destroy cancer cells taken from a human cancer of the neck of the womb and kept growing in test tubes since February, 1951.

Whether their studies will be of any use in treating cancer patients is not known, according to the American Cancer Society, which supported the research.

Scientists at other laboratories have tried to treat both animals and humans by giving them both living and dead viruses, but patients have not been cured by such tests.

Science News Letter, May 14, 1955

AGRICULTURE

To Control Insect Pests By Preventing Growth

➤ A NEW concept of insect control, keeping insects from growing up, is being evolved by scientists at the U. S. Department of Agriculture research center in Beltsville, Md. It promises fewer houseflies and safer foods.

Applied to insect and pest control, it promises to be as important as the introduction of DDT more than a decade ago.

Using "Peter Pan" chemicals, the aim of the new concept is to keep insect pests from ever becoming adults and laying eggs rather than killing them outright. These chemicals had been thought to be too mild as conventional insecticides.

Preliminary tests already indicate that these chemicals can be used effectively against DDT-resistant flies, now the rule rather than the exception in many areas. In addition, the chemicals are "non-toxic" to humans and animals and allow control where poisonous insecticides could not be used.

Foreseeing the growth-inhibiting control method as a valuable weapon of the future, the Agriculture scientists have found that chemicals like colchicine and aminopterin prevent cell division. Others, sulfanilamide and coumarin, slow down an insect's metabolism. In the past, many of the chemicals were used with highly toxic insecticide agents, but rarely alone.

In one test with piperonyl butoxide, used alone, DDT-resistant flies were more affected than normal ones. Only three percent of the resistant-flies reached adulthood.

The scientists point out that much experimental work is still to be done, but use of the "slow-down" chemicals will receive wider attention in the next few years.

Science News Letter, May 14, 1955

PHYSICS

Future of Atomic Energy

Sir John Cockcroft, head of Britain's Atomic Research Establishment, answers questions most often asked about the industrial future of atomic energy.

By SIR JOHN COCKCROFT

Sir John Cockcroft won the Nobel Prize in physics in 1951 and played an important role in atomic development, having collaborated as early as 1932 in the first successful high-voltage atom-smashing machine. He is a member of the United Kingdom Atomic Energy Authority.

➤ PROGRESS IN the peaceful application of atomic energy in Britain has excited world-wide interest, and I have been asked many questions on the possibilities of the use of atomic power for industrial purposes in other countries. Here are answers to questions I am sometimes asked:

Q. Do you think that atomic reactors for power purposes will be of value to less developed countries, and how soon will atomic power be available to them?

A. Atomic power will be of just as much value to less developed countries as water power or power from coal and gas; where an undeveloped country has ample resources of conventional power, atomic power will have no advantages for the next 10 to 15 years until its cost becomes less than conventional power costs. Its immediate role in the world is to supplement conventional energy sources where they are becoming inadequate. For such purposes it could become available in the early 1960's.

Q. Does disposal of atomic waste present any difficult problem?

A. The disposal of atomic waste is one of the many technological problems which have to be solved during the next decade. This, like the other problems, is being extensively worked on, and there is no reason to suppose it cannot be solved, since the volume of the waste produce is very small when concentrated.

Q. Is there an immediate prospect of getting electricity from atomic power?

A. Atomic power will be available in Britain on a scale comparable with that from a normal large power station within two to three years.

Q. Will the cost of atomic power compare favorably with that of power generated by orthodox means?

A. Atomic power is likely to cost rather more than conventional power during the first five years of its use, but the cost will probably be little different from conventional power costs in ten years' time.

Q. What is the likelihood of ships being powered by atomic units as an economic proposition?

A. Commercial atomic ship propulsion is not likely to be economic for the next decade.

ATOMIC EXPERT—Prof. Sir John Cockcroft, who answers queries about energy for the future, assumes a thoughtful pose in this official British Information Services portrait.

Q. To what extent are products of atomic energy being used for medical purposes?

A. The by-products of atomic energy are being used on a greater scale for medical purposes; Harwell and its outstation send out 12,000 consignments a year to hospitals throughout the world.

Q. What is the potential range of use of atomic energy products in industry?

A. The use of atomic energy products in industry is steadily growing; some of the applications in use already are the following:

Control of thickness of strip material for rolling mills, discharging of static electricity in textile operations, radiography, oil prospecting, control of movement of fluids in pipelines, detection of leaks in water mains, fire alarms, industrial research, detection of liquid level in enclosed systems, preionization in gas discharge tubes, testing the efficiency of filters, measurement of wear in test engines for testing lubricants, checking efficiency of industrial mixing processes, investigations of alloy structure and casting procedure, checking migration of constituents in paper manufacture, measurement of plant nutrients in soil and uptake of fertilizer, investigation of silt movements in an estuary and microanalysis of trace constituents in chemical and metals.

Science News Letter, May 14, 1955

MEDICINE

Lung's "Coin Shadows" May Indicate Cancer

➤ SHADOWS THAT look like coins in the lungs may indicate the beginnings of lung cancer, Dr. Alexander G. Gilliam of the National Cancer Institute, Bethesda, Md., reported to the Fifth Inter-American Congress of Radiology meeting in Washington.

Patients with incipient cancer causing "coin shadows," he pointed out, are highly selected cases from specialized centers. To find out whether these shadows truly represent the beginning of lung cancer, the Institute is surveying all persons found to have them in an X-ray survey of the general population, trying to follow them through to ultimate diagnosis.

Some have already submitted to surgery, he said, "but a large number have thus far refused further diagnostic investigation."

Dr. Gilliam noted that there is some evidence that lung cancer is insidious, giving no indication of its presence for many years.

Dr. Leo G. Rigler, director of the department of radiology at the University of Minnesota Medical School, said that development of lung cancer is a much slower, more prolonged process that had been thought.

On the other hand, Dr. Gilliam said, there is also evidence that lung cancer is of short duration, diagnosed only briefly before it strikes the patient down.

Science News Letter, May 14, 1955

ELECTRONICS

Glass Rods Guide Tiny Radio Waves

➤ NEW KINDS of circuit elements using glass rods split in half to guide radio waves only one-twelfth of an inch long were reported by Dr. D. D. King of Johns Hopkins University.

Placing the flat face on a thin metal plate provides the necessary guidance for the tiny radio waves, known as millimeter waves, he told the International Scientific Radio Union meeting in Washington.

Millimeter waves at present are a laboratory curiosity being studied by scientists to learn about their properties.

Science News Letter, May 14, 1955

CHEMISTRY

New Protein Solvent

➤ NEW LIGHT on protein, fundamental building material of animal bodies, comes from discovery that liquid sulfur dioxide will dissolve protein if certain kinds of salts are added to the liquid.

Dr. Joseph J. Katz of the Argonne National Laboratory, Lemont, Ill., made the discovery that addition of an iodide or a thiocyanate salt of an alkali metal changes the sulfur dioxide liquid into a solvent for protein. Previous researchers had found the material inert.

Guided by the well-known fact that a little ordinary salt helps many chemicals dissolve in water, Dr. Katz tried the effect of salts which dissolve in the sulfur-containing liquid. His technique succeeded in making this substance dissolve protein, one of the less soluble organic materials. This advance in methods of studying the fundamental life material is reported in *Science* (April 29).

Sulfur dioxide, the pungent gas noticed when striking a match, becomes a liquid at 14 degrees above zero Fahrenheit. In making protein solutions by Dr. Katz' method it is necessary to work at temperatures lower than this. Addition of more of the liquid without more of the salt precipitates the protein again. Whether this precipitated protein differs appreciably from the material originally dissolved has not yet been determined. New understanding of the building material of living tissues may come from work on this new form of protein.

One of the advantages claimed by Dr. Katz for the new solvent method is that it will avoid confusion due to overlapping of effects caused by other solvents with those due to the dissolved protein. He points out that "there are certain advantages to the study of the infrared spectrum of proteins in solution rather than as films or fibers. This has been, at best, a difficult task, since the usual protein solvents obscure at least a major portion of the infrared spectrum of the protein. With liquid sulfur dioxide as a solvent, the situation is greatly improved."

"Because potassium iodide is transparent in the infrared, the infrared spectrum of proteins dissolved in sulfur dioxide-potassium iodide solution can be readily studied.

Science News Letter, May 14, 1955

MEDICINE

Radioactive Phosphorus Used in Breast Cancer

➤ RADIOACTIVE PHOSPHORUS, combined with X-rays and surgery, make a good team for treatment of breast cancer, Drs. Bertram V. A. Low-Beer and H. Glenn Bell of the University of California told the Fifth Inter-American Congress of Radiology meeting in Washington.

More time will be needed for a clear analysis of results from this combined treatment, they said, but their hope is that more patients will survive not only five years but ten years without recurrence of the disease.

"Five-year disease-free survival has not been improved significantly in the past 20 years," Dr. Low-Beer said. Any improvement in survival figures is due to stricter selection of patients for surgery rather than an actual increase in number of patients saved.

Treatment for breast cancer, he said, must be directed not only to local area of involvement, but to any cancer tissue remote from the immediate region.

Science News Letter, May 14, 1955

TECHNOLOGY

Get Sugar Juice by Dashing Beet Chips

➤ A NEW method to get the juice from sugar beets, smashing chips to a pulp against a baffle, was described at the meeting of the American Institute of Chemical Engineers in Houston, Tex.

Equipment for the process is simple in design and small for its maximum capacity, 23 pounds per minute, L. E. Brownell, S. A. Zieminski and T. H. Lee of the University of Michigan reported.

Shooting the chips along with liquid into the barrier ruptures the cells, freeing the sugary juice.

Science News Letter, May 14, 1955

URANIUM–TUNGSTEN–MERCURY
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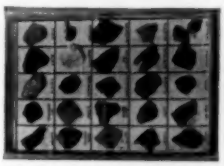

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIRBORNE CONTAGION AND AIR HYGIENE: An Ecological Study of Droplet Infections—William Firth Wells—*Commonwealth Fund (Harvard University Press)*, 423 p., illus., $6.00. Defining the behavior of airborne parasites and describing the habits that make people accessible to airborne parasites.

AMERICA'S NEEDS AND RESOURCES: A New Survey — J. Frederic Dewhurst and others — *Twentieth Century Fund*, 1148 p., illus., $10.00. Giving the present position of American economic resources, production and consumption, and establishing a basis of comparison with earlier figures, thus making it possible to see the extent of progress made.

BIOLOGICAL SPECIFICITY AND GROWTH—Elmer G. Butler, Ed.—*Princeton University Press*, 233 p., illus., $5.00. Report of a symposium held jointly by the Society for the Study of Development and Growth and the Committee on Developmental Biology of the National Research Council at the University of New Hampshire, June 1953.

THE BIRD BOOK—Leon Augustus Hausman—*Arco*, 159 p., illus., $2.50. With the pictures and the descriptions one should be able to recognize the common birds of North America.

THE CARE OF YOUR SKIN—Herbert Lawrence—*Little, Brown*, 95 p., illus., $2.50. Explains in simple language the structure and care of the skin and tells what can be done to meet the problem of acne.

CONTROL OF COMMUNICABLE DISEASES IN MAN: An Official Report of the American Public Health Association—*American Public Health Association*, 8th ed., 219 p., paper, 60 cents. Designed as an aid in formulating standard regulations for administrative control of communicable diseases. This new edition has been enlarged to give more comprehensive coverage of world infections.

DYNAMIC TESTS OF SUSPENSION BRIDGE SECTION MODELS—F. J. Maher, L. A. Becker and D. B. Steinman—*Virginia Polytechnic Institute*, Engineering Experiment Station Series No. 98, 27 p., illus., paper, 35 cents. Results of static and dynamic wind tunnel tests.

FISHING BOATS OF THE WORLD — Jan-Olof Traung, Ed., *Arthur J. Heighway Publications*, 579 p., illus., $12.50 plus postage. Upon the efficiency of design and and operation of fishing boats depends the economy of millions of people. This book is based on two gatherings of the Fishing Boat Congress organized by the Food and Agriculture Organization of the United Nations.

HEATING VENTILATING AIR CONDITIONING GUIDE 1955—R. E. Cherne, Chairman—*American Society of Heating and Air-Conditioning Engineers, Inc.*, Vol. 33, 1680 p., illus., $12.00 plus postage.

A LABORATORY MANUAL OF QUALITATIVE ORGANIC ANALYSIS—H. T. Openshaw—*Cambridge University Press*, 3rd ed., 92 p., $2.00. The text has been extensively revised and partly rewritten for this edition.

MEETING THE CHALLENGE OF CANCER—Prepared by the Cancer Reports Section of the National Cancer Institute—*Govt. Printing Office*, 23 p., paper, 15 cents. Presenting some of the recent accomplishments in cancer research.

MOTION AND TIME STUDY: Principles and Practice—Marvin E. Mundel—*Prentice-Hall*, 2nd ed., 575 p., illus., $9.35. New material covering recently developed approaches to problems has been included.

OPTICAL PROPERTIES OF THIN SOLID FILMS—O. S. Heavens—*Academic*, 261 p., illus., $6.80. Surveying the work done on thin films, a field which Sir Isaac Newton first wrote about in the 17th century.

PHYSICAL CHEMISTRY—Farrington Daniels and Robert A. Alberty—*Wiley*, 671 p., illus., $6.50. A textbook for a first course in physical chemistry with emphasis on practical examples.

PRINCIPLES OF ELECTRIC UTILITY ENGINEERING—Charles A. Powel—*Technology Press of MIT and Wiley*, 251 p., illus., $6.00. A concise review of the problems which, in the author's experience, appeared to be basic to the design and operation of a utility.

PSYCHOLOGY IN LIVING — Wendell White — *Macmillan*, 3rd ed., 317 p., $4.50. The problems of successful living, the author says, are basically the problems of human relationships, and better living can be fostered through psychology.

SAY IT IN JAPANESE—Miwa Kai—*Dover*, 124 p., paper, 33 1/3 RPM record, $1.49. This record and booklet combination gives the pronunciations for common phrases and expressions that would be useful to the traveler in a foreign land.

SAY IT IN SWEDISH — By Birgit and Ake Leander—122 p., paper, 33 1/3 RPM record, $1.49. A pronunciation guide for tourists and students.

SEX AND THE NATURE OF THINGS—N. J. Berrill — *Pocket Books*, 222 p., illus., paper, 35 cents. Written, the author says, "to make a survey of sex throughout the living kingdom." Originally published by Dodd, Mead in 1953.

SHELL THEORY OF THE NUCLEUS — Eugene Feenberg—*Princeton University Press*, 211 p., illus., paper, $4.00. A guide to the theory of nuclear shell structure based on the development of the spin-orbit level scheme for those who are familiar with the elements of nuclear physics and quantum theory.

THE URANIUM PROSPECTOR'S GUIDE—Thomas J. Ballard and Quentin E. Conklin — *Harper*, 251 p., illus., $3.50. Designed to give in nontechnical language the basic information necessary to the prospector, miner or layman who is interested in uranium raw materials. The authors were formerly with the Exploration Division of the Atomic Energy Commission.

VEGETABLE PRODUCTION AND MARKETING — Paul Work and John Carew—*Wiley*, 2nd ed., 537 p., illus., $4.72. Designed as an introduction to the subject with descriptions of practical operations.

Science News Letter, May 14, 1955

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PSYCHOLOGY

Woman's Dual Role Causes Domestic Strife

➤ MODERN WOMAN'S attempt to be a "man by day, a woman by night" is the cause of unhappy or broken homes, Dr. Richard Centers, assistant professor of psychology at the University of California at Los Angeles, suggests.

"The mass invasion by women of what has long been considered the man's world of business is apparently leading to abandonment of the tradition of woman's place as being properly in the home. As a result there is much confusion as to what woman's role really should be," he points out.

"Many women are actually forced to play a dual role. They still need to prove themselves as women. They want marriage and a family. But they also expect to compete with men as equals in the business world. The attempt to be a wife and mother by night and a successful executive by day becomes a little too much for them.

"In some cases this leads to a rejection of the feminine role," he says. "From a long range point of view this could contribute to a decline in the national birth rate."

"Husbands too are confused, and this leads to tension and broken homes," he adds. "Thus children are the biggest losers."

What is the solution to the problem?

Dr. Centers believes both sexes will adjust to this new, wider scope of feminine activity in time.

"One thing is certain," he says, "if mankind is to survive, woman cannot completely escape the feminine role imposed by her biological destiny."

Science News Letter, May 14, 1955

MEDICINE

Throat Swab for Polio

➤ TESTS TO see whether people can be protected against polio by swabbing their throats with a weakened polio virus are now under way, Dr. Albert B. Sabin of the University of Cincinnati College of Medicine announced at the meeting of the Association of American Physicians in Atlantic City, N. J.

The Salk polio vaccine now being given to thousands of school children across the nation is made from killed polio virus. But Dr. Sabin has long thought that a live virus bred to lose its paralyzing power might give better immunity.

He pointed out that polio is generally more severe in adults than in very young children and that any method of immunization must avoid the possibility of creating a large adult population without resistance to the disease.

Natural infection, he also pointed out, seems to provide the body with a "built-in" booster mechanism. After once being infected with the virus, even without further infection, the body continues to produce specific polio antibodies for as long as 40 years.

Polio viruses which have through mutation lost their ability to produce disease in chimpanzees have been fed in a teaspoonful of milk to volunteer inmates of a Federal Reformatory. The volunteers, aged 21 to 30, were shown by tests to lack antibodies for one or more types of polio viruses at the start of the experiments.

The studies showed, among other things, that more antibodies were formed when the virus multiplied in the throat than when it multiplied in other tissues of the body. This suggested that a more localized infection with better immunologic response, or protection, might come from swabbing the virus directly on the throat.

Dr. Sabin is also now investigating the behavior of Types 1, 2, and 3 polio viruses, recovered from healthy children. These viruses do not produce disease in monkeys even when injected directly into the monkeys' brains. These will be compared with the strains that do not produce disease in chimpanzees, to see which of the weakened viruses are best to use and whether best protective results can be had from giving the virus in milk or from swabbing it on the throat.

Science News Letter, May 14, 1955

MEDICINE

Virus During Pregnancy May Give Child Palsy

➤ VIRUS INFECTIONS in prospective mothers during early pregnancy may have some effect in producing cerebral palsy and other congenital disorders in their children.

This is suggested in preliminary experiments at the University of California at Los Angeles Medical Center.

In studies by doctors in the departments of pediatrics and infectious diseases, influenza and distemper viruses were injected into fertile hen eggs.

About a day after inoculation, chick embryos infected with flu viruses had sharp bends in their backs and a day later these embryos also showed extensive brain and eye damage.

Distemper-infected embryos developed large lesions on the extra-embryonic membranes and died about eight days later.

While emphasizing that animal experiments can seldom be translated directly into human terms, the investigators said their experiments did suggest an explanation for certain congenital abnormalities and disorders in humans.

When human mothers have serious virus infections in early pregnancy damage to the embryo may result, they point out. Women who have German measles during pregnancy often have children born deaf or with eye cataracts. It is possible that brain damage to a human embryo may occur with such virus infections as flu in the pregnant mothers.

Science News Letter, May 14, 1955

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ORNITHOLOGY

NATURE RAMBLINGS

Indigo Bunting

➤ IF YOU are walking along the edge of the woods, or across brushy pasture, and see a flash of blue winging through the air, look twice before you decide that it is a bluebird. It may be that somewhat less abundant but equally beautiful bird, the indigo bunting.

There is no danger of confusing the two birds, if you can get a fair look at the indigo bunting. The indigo bunting has no red underneath, as the bluebird has, but is blue on both breast and back. The only feathers he has that are not blue are the large dark ones of his wings and tail, and even these are blue edged. This is his summer garb; in winter, he has a general sparrow-like appearance.

His mate keeps her sleek but inconspicuous brown dress the year round. She has not a single distinctive feature to allow instant identification, and in coloring she most resembles a plain little brown striped sparrow.

The song of the indigo bunting is a beautiful, sustained trill, not unlike that of a canary. Indeed, one of the less familiar names for this bird is blue canary. The bunting is very fond of singing, too, and will frequently stage a recital in midsummer, long after most other birds have become silent.

The persistence of his sweet, simple song when other birds are quietly seeking relief from the heat is one of the surprises of this bird. Many and many a highway can be traversed in the heat of day without hearing one bird utter even a short note, except the indigo bunting.

Indigo buntings are not as well known, perhaps as bluebirds, even though they are often mistaken for them. This is because they are rather more shy of humankind and prefer to live in the tangled thickets and broken woodlands, remote from habitations. But for the nature lover they are worth patient seeking, for they have few peers and no superiors in beauty among our native birds.

There is a jewel-like brightness about their deep blue feathers that surpasses the bluebird's blue.

Science News Letter, May 14, 1955

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ENGINEERING

"Brain" Helps Design Electric Motors

➤ DESIGNERS OF electric motors have a new trouble-shooter—an electronic "brain" that can analyze the motor's interior forces.

The device works on all size motors, and when used on larger machines it gives data that are not often possible or are very costly to obtain.

The brain promises to reveal information about motors that have been predicted by calculation but could not be confirmed by tests, J. M. Shulman and H. W. Hansen of Westinghouse Electric Corporation told a meeting of the American Institute of Electrical Engineers in Columbus, Ohio.

Science News Letter, May 14, 1955

TECHNOLOGY

Fresh Water From Saline

➤ ENERGY, HARNESSED from the sun and the atom, may some day convert salt water into fresh water. But it is now too expensive.

This was the opinion expressed by Sheppard T. Powell, Baltimore, Md., engineer, an adviser to the government's Saline Water Conversion Program, before the International Arid Lands Meetings in Albuquerque, N. M.

"Inquisitive search for usable fresh water over the years," he said, "has resulted in many workable processes for desalting saline waters."

But, he cautioned, although research has brought into sight "the goal of producing fresh water at a cost which consumers can pay," it remains "at present unrealistic for the continental United States."

Chiding the non-technical press in the United States for being "overly optimistic in dramatizing the developments in the conversion of saline water," Mr. Powell said that to many people, especially in this country, changing salt water to fresh water is an Aladdin's lamp.

"This optimism has led many to believe that there will soon be ample quantities of fresh water, produced at a cost comparable to that of natural fresh water supplies."

Looking to the future, Mr. Powell listed some of the new methods being tried by scientists.

One distills salt water by rapid-boiling it in a vacuum. Another is electro-ion migration, likened to electroplating. In this process, molecular fragments of the dissolved salts are electrically extracted through thin membranes. Synthetic membranes now being tested may put this process into a fair price range.

"The crux of realistic accomplishment in demineralization of saline water anywhere rests wholly on permissible cost," Mr. Powell said. Inexpensive power is needed. Nuclear reactors, low-grade fuel, off-peak or dump power at cheaper rates or solar stills which harness the sun's ray all may be possible answers.

The government adviser credited the increase in effort, to find the answers needed urgently in the arid and semi-arid areas that cover a third of the earth's land surface, to the work of the Saline Water Conversion Program in the United States and to the world-wide pooling of knowledge on the problem organized and planned by Unesco.

Science News Letter, May 14, 1955

The *cassowary*, a bird found in New Guinea and Australia, weighs up to 90 pounds.

Questions

CHEMISTRY—The pungent gas noticed when you strike a match has been used to dissolve what substance? p. 315.

□ □ □

MEDICINE—What are two possible reasons for the recent attacks of polio after vaccination? p. 310.

□ □ □

METEOROLOGY—How is it suggested that man induce rain by the reverse of cloud seeding? p. 319.

□ □ □

PHYSICS—What is the half-life of the newly discovered element 101? p. 307.

□ □ □

PSYCHOLOGY—What is the new theory to explain why some homes are unhappy or broken? p. 316.

□ □ □

Photographs: Cover, Fremont Davis; p. 307, Convair; p. 309, Clifford E. Matteson; p. 311, General Electric Company; p. 314, British Information Services; p. 320, Bakelite Company.

METEOROLOGY

Suggest Reverse of Cloud Seeding Method

➤ THE POSSIBILITY of making rain by removing particles from the air, the reverse of cloud seeding as now practiced, was suggested to the International Arid Lands Meetings in Albuquerque, N. M., by Dr. Glenn W. Brier of the U. S. Weather Bureau in Washington.

It would be interesting to discover, he said, how nature knows the best concentration for rain and how "overseeding" is prevented. Present rainmakers operate on the assumption that the natural supply of rain-forming nuclei is insufficient. They, therefore, attempt to add more by throwing various chemicals into the atmosphere. Adding too much might inhibit rainfall, Dr. Brier said.

Although he sees no "immediate solution to weather modification," there is "no reason to be pessimistic" about the future.

"Man," he said, "is gradually learning to control such things as the atom, cancer, etc., and there is no good reason to think that weather is beyond his reach."

At one time only one mechanism for rainfall was known. Now several methods are being considered, indicating that if nature does not make it rain one way, she provides another.

Science News Letter, May 14, 1955

MEDICINE

New Surgery Technique Restores Use of Legs

➤ VICTIMS OF hardening of arteries of the thigh can regain normal use of their legs through an improved operation developed by Dr. Jack Cannon and Dr. Wiley Barker of the University of California at Los Angeles Medical School.

Hardening of the arteries results when cholesterol, a fatty substance, lines the interior walls of the arteries. When this happens in the thigh, the flow of blood to the leg is blocked, restricting its use. Gangrene frequently sets in, requiring amputation.

In the new procedure, an incision is made just above and below the plug. A loop of piano wire is inserted through the lower incision and the plug is stripped from the arterial wall and pushed out the upper incision.

In addition to the cholesterol plug, there generally occurs a thickening of portions of the arterial wall. After the plug has been removed, these layers tend to collapse with the restoration of blood flow, and again the flow is blocked. The U.C.L.A. doctors have found that by stitching these collapsed layers to the wall they can prevent this problem.

The new procedure only requires about two hours in surgery. Of 23 patients on which it has been performed, 20 have had normal pulse restored and have regained normal or almost normal use of their legs.

Science News Letter, May 14, 1955

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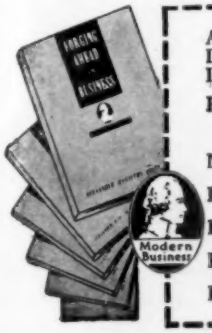
If you would like a complimentary copy of "Forging Ahead in Business," simply sign and return the coupon below. It will be mailed to you promptly.



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Science News Letter, May 14, 1955

ICE HAMMER-CORKSCREW affords the housewife a handy tool for this summer's increased beverage business. A German import, the vari-purpose tool has a hammer and bottle-opener head that screws on and off a leather-covered handle, revealing the corkscrew. The overall length of the kitchen gadget is 5¾ inches.

Science News Letter, May 14, 1955

LIGHTWEIGHT CHAIR can be carried on picnics, to the beach or most anywhere in a compact carrying case. Weighing only five pounds, when folded the lounge chair measures 2½ by 6 by 26 inches long. The portable chair has an aluminum frame with the seat of water-repellent duck, and comes in a carrying case made of reinforced plastic.

Science News Letter, May 14, 1955

OFF-LINKS GOLF game, shown in the picture, that can be played anywhere outdoors has three practice balls of different colors and two target cups, all made of plastic. Scoring as in golf, the distance from the mesh pockets that are held off the ground by metal pins determines which club to use.

Science News Letter, May 14, 1955

WIRE SCULPTURE kit is designed for hobbyists and craftsmen young and old. Just a few turns of the multi-colored covered copper wire around a wire skeleton produces wire art. Wire can be used with other items such as pipe cleaners and can be unwound and re-used.

Science News Letter, May 14, 1955

ENGINE LUBRICANT for two- and four-cycle power mowers and outboards replaces motor oil. Described as preventing gumming of the motor during storage as well as the formation of acid and sludge, it is available in one-pint containers, for easy storage.

Science News Letter, May 14, 1955

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Science News Letter, May 14, 1955

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A *heater* for airplane windshields has been developed that warms electrically and is sprayed on the glass in a sheet 1/20th of an inch thick.

Platelets, tiny cell fragments found in the blood, arrest bleeding by sticking to the edge of the wound and to each other until they pile up into a little cork that fills the hole.

The New York State Health Department urged hospitals to discontinue routine administration of oxygen to premature babies in an effort to cut down the cases of *blindness* in such children.

Science News Letter, May 14, 1955